

REMARKS

Claims 1-3 and 56-80 are pending in this application, with claims 1, 56-59, 61, 65, 69, 73 and 77 being independent. Claims 61, 65, 69, 73 and 77 have been amended, and claims 56-59 are withdrawn.

Independent claims 61, 65, 73, and 77, along with their dependent claims 62-64, 66-68, 74-76, and 78-80 have been objected to as reciting an improper Markush group. Claims 61, 65, 73, and 77 have been amended in accordance with the Examiner's instructions to properly use the term "consisting of" rather than the term "comprising." Applicants, therefore, request withdrawal of this objection.

Independent claim 77, along with its dependent claim 80, has been rejected as being anticipated by Kido (U.S. Patent No. 6,396,209). Applicants traverse this rejection.

Claim 77 recites an organic light emitting element having an organic compound film that includes an "electron transporting compound that has an electron mobility that is larger than its hole mobility" and an "electron injecting compound that receives electrons from the cathode." The organic compound film also includes a "region in which the two compounds are mixed." Applicants request reconsideration and withdrawal of the rejection of claim 77, and its dependent claim, because Kido does not describe or suggest an organic compound film that includes a region in which an electron transporting compound and an *electron injecting compound* are mixed.

Kido describes an organic electroluminescent device that includes a mixed layer 5, which the Examiner equates to the recited region. The mixed layer 5 of Kido, however, is a mixture of an *organic metal complex compound* used to form the metallic electrode of the device and an electron transporting compound, rather than a mixture of an *electron injecting compound* and an electron transporting compound, as claimed. See col. 3, lines 37-54.

For at least this reason, applicants request reconsideration and withdrawal of the rejection of claim 77 and its dependent claim 80.

Independent claim 69 and its dependent claim 72 have been rejected as being anticipated by Wakimoto (U.S. Publication No. 2001/0043044). Applicants have amended claim 69 to obviate this rejection.

Claim 69, as amended, recites an organic light emitting element having an organic compound film that includes "a blocking compound capable of stopping the movement of holes or electrons and at least one compound selected from the group consisting of: a hole injecting compound that receives holes from the anode; a hole transporting compound that has a hole mobility that is larger than its electron mobility; an electron transporting compound that has an electron mobility that is larger than its hole mobility; and an electron injecting compound that receives electrons from the cathode; ..." The organic compound film also includes a "region in which the two compounds are mixed, and wherein *a concentration change in the region is continuous*" (emphasis added). Applicants request reconsideration and withdrawal of the rejection of claim 69, and its dependent claim, because Wakimoto does not describe or suggest an organic compound film that includes a region in which the recited compounds are mixed such that a concentration change in the region is continuous.

Wakimoto describes an organic electroluminescent element that includes a laminated structure having a mixed layer 45, which the Examiner equates to the recited region, made by mixing a material used for a light emitting layer 4 and an electron transport material used for a hole blocking layer 5. Paragraph 0024. Aside from stating that the mixed layer may be formed by coevaporating materials in different proportions, Wakimoto is entirely silent as to any concentration gradient or distribution in the mixed layer 45, much less the claimed continuous concentration change.

For at least this reason, applicants request reconsideration and withdrawal of the rejection of claim 69 and its dependent claim 72.

Independent claim 73 and its dependent claim 76 have been rejected as being anticipated by Wakimoto and anticipated by Fujii (U.S. Patent No. 5,674,597). Applicants have amended claim 73 to obviate these rejections.

Claim 73, as amended, recites an organic light emitting element having an organic compound film that includes “at least two compounds selected from the group consisting of: a hole injecting compound that receives holes from the anode; and a hole transporting compound that has a hole mobility that is larger than its electron mobility.” The organic compound film also includes a “region in which the two compounds are mixed, and wherein *a concentration of the hole injection compound decreases monotonically from the anode to the cathode*” (emphasis added). Applicants request reconsideration and withdrawal of the rejection of claim 73, and its dependent claim, because neither Wakimoto, Fujii, nor any proper combination of the two describes or suggests an organic compound film that includes a region in which the recited compounds are mixed such that a concentration of the hole injection compound decreases monotonically from the anode to the cathode.

As stated previously, Wakimoto is entirely silent as to the concentration distribution in the mixed layer 45, and, therefore, does not describe or suggest the recited region having a monotonically decreasing hole injection compound concentration.

Fujii discloses an electroluminescent element capable of operating at a low driving voltage that includes a hole transport layer 3 in which is dispersed hole injection material 6 for the purpose of decreasing or dividing device energy barriers to decrease device driving voltage. See Fig. 3; col. 5, lines 26-31; and col. 6, lines 16-19. Fujii, however, is entirely silent as to the concentration distribution of the hole injection material 6 in the hole transport layer 3. Accordingly, Fujii, like Wakimoto, also does not describe or suggest the recited region having a monotonically decreasing hole injection compound concentration.

For at least these reasons, applicants request reconsideration and withdrawal of the rejections of claim 73 and its dependent claim 76.

Independent claim 61 and its dependent claim 64 have been rejected as being anticipated by Fujii and unpatentable over Wakimoto in view of Fujii. Applicants have amended claim 61 to obviate these rejections.

Claim 61, as amended, recites an organic light emitting element having an organic compound film that includes “at least two compounds selected from the group consisting of: a

hole injecting compound that receives holes from the anode; and a hole transporting compound that has a hole mobility that is larger than its electron mobility.” The organic compound film also includes a “region in which the two compounds are mixed ... wherein *a concentration of the hole injection compound decreases monotonically from the anode to the cathode*” (emphasis added). For at least the same reasons described above with respect to claim 73, applicants request reconsideration and withdrawal of the rejection of claim 61, and its dependent claim 64. In particular, neither Fujii, Wakimoto, nor any proper combination of the two describes or suggests an organic compound film that includes a region in which the recited compounds are mixed such that a concentration of the hole injection compound decreases monotonically from the anode to the cathode, as recited in claim 61.

Independent claim 65 and its dependent claim 68 have been rejected as being unpatentable over Kido in view of Fujii. Applicants traverse this rejection.

Claim 65 recites an organic light emitting element having an organic compound film that includes “at least two compounds selected from the group consisting of: an electron transporting compound that has an electron mobility that is larger than its hole mobility; and an electron injecting compound that receives electrons from the anode.” The organic compound film also includes a “region in which the two compounds are mixed, and wherein the electric current versus electric voltage property of the organic light emitting elements show a rectification property.” Applicants request reconsideration and withdrawal of the rejection of claim 65, and its dependent claim, because neither Kido, Fujii, nor any proper combination of the two describes or suggests (1) an organic compound film that includes a region in which an electron transporting compound and *an electron injecting compound* are mixed and (2) the recited organic light emitting element having an electric current versus electric voltage property that exhibits a rectification property.

As described above with respect to claim 77, Kido does not describe or suggest an organic compound film that includes a region in which an electron transporting compound and an electron injecting compound are mixed. Fujii also does not describe or suggest such a mixed region. Fujii discloses an electroluminescent element capable of operating at a low driving

voltage that includes a *hole* transport layer 3 in which is dispersed *hole* injection material 6. Accordingly, Fuji, like Kido, does not describe or suggest a film or layer that includes a mixture of an *electron* transporting material and an *electron* injecting compound.

As the Examiner admits on page 6 of the Office Action, Kido also does not describe or suggest an organic light emitting element having an electric current versus electric voltage property that exhibits a rectification property. The Examiner refers to Fujii as disclosing this limitation. However, the only electric current versus electric voltage property described in Fujii is that shown in Fig. 4, which shows a monotonically increasing current density with voltage. Such an I-V property does not show the claimed rectification property. Rectification requires asymmetry with respect to an origin or zero point. No such asymmetry is shown in Fig. 4. On the contrary, the I-V property of Fig. 4 exhibits a continual increase of current density with voltage. Accordingly, neither Fujii, Kido, nor any proper combination of the two describes or suggests the recited organic light emitting element having an electric current versus electric voltage property that exhibits a rectification property.

For at least these reasons, applicants request reconsideration and withdrawal of the rejection of claim 65 and its dependent claim 68.

Independent claim 1 and its dependent claim 60 have been rejected as being unpatentable over Wakimoto in view of Fujii. Applicants traverse this rejection.

Claim 1, as amended, recites an organic light emitting element having an organic compound film that includes “a blocking compound capable of stopping the movement of holes or electrons and at least one compound selected from the group consisting of: a hole injecting compound that receives holes from the anode; a hole transporting compound that has a hole mobility that is larger than its electron mobility; an electron transporting compound that has an electron mobility that is larger than its hole mobility; and an electron injecting compound that receives electrons from the cathode; ...” The organic compound film also includes a “region in which the two compounds are mixed, and wherein the electric current versus electric voltage property of the organic light emitting elements show a rectification property.” Applicants request reconsideration and withdrawal of the rejection of claim 1, and its dependent claim 60,

because neither Wakimoto, Fujii, nor any proper combination of the two describes or suggests the recited organic light emitting element having an electric current versus electric voltage property that exhibits a rectification property.

As the Examiner admits on page 7 of the Office Action, Wakimoto does not describe or suggest an organic light emitting element having an electric current versus electric voltage property that exhibits a rectification property. The Examiner refers to Fujii as disclosing this limitation. However, for the reasons discussed above with respect to claim 65, Fujii also does not describe or suggest this rectification feature.

Accordingly, applicants request reconsideration and withdrawal of the rejection of claim 1 and its dependent claim 60.

Claims 2, 3, 62, 63, 70, 71, 74, and 75, which depend from claims 1, 61, 69, and 73, have been rejected as being unpatentable over Wakimoto or Wakimoto in view of Fujii and further in view of Arai (U.S. Patent No. 6,303,239). Claims 62, 63, 74, and 75 have also been rejected as being unpatentable over Fujii in view of Arai. Arai does not remedy the deficiency of Wakimoto and Fujii to describe or suggest the subject matter of claims 1, 61, 69, and 73. Applicants, therefore request reconsideration and withdrawal of the rejections of claims 2, 3, 62, 63, 70, 71, 74, and 75.

Applicants submit that all claims are in condition for allowance.

Applicant : Satoshi Seo et al.
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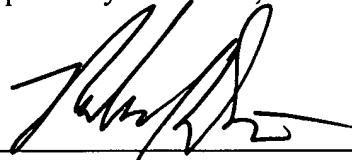
Attorney's Docket No.: 07977-292001 / US5444

Enclosed is a check for \$120 the Petition for Extension of Time fee. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: _____

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